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AUTO INDUSTRY BAILOUT:

TOO BIG TO FAIL. TOO BIG FOR WHOM?

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ABSTRACT

The bailout of the American Auto Industry is considered the largest government intervention in industrial America since the Second World War. Almost 80 billion dollars were injected in an industry that in 2007 represented 1 million manufacturing jobs, and 3.7% of the American GDP. This work project intends to study the impact of such an occurrence in other economic Sectors of the American Economy, by looking at how the Share Price Returns of the major American firms react to the Auto Bailout Events. Some Sectors seem more tightly connected to the Auto Industry than others. The perception of the Bailout Events is also different according to the Sector and to the spectrum of time considered.

Keywords: bailout, financial markets, auto industry

1. INTRODUCTION

Charles Erwin Wilson was the President of General Motors, leading the company since 1941 and all through World War II, when President Eisenhower nominated him as Secretary of Defense in January of 1953. After his nomination, and before a Senate Committee, when asked if he could make a decision as Secretary of Defense that would be adverse to the interests of General Motors, Wilson replied by saying "what is good for General Motors is good to the United States of America and vice-versa".[1] General Motors, at the time was, and still is, the leading firm of the American Auto Industry.

[1] Page 32. Crash Course (2011).

This statement, misfit or not, together with the fact that an outstanding political figure was coming from the leadership of one of the three big American automakers, shows the historical importance of the Auto Industry, born in the beginning of the twentieth century, both to the United States Economy and to United States Politics.

The history of the Big-Three American automakers - General Motors, Ford, and Chrysler - all based in the city of Detroit, in Michigan, is tightly connected with the success of the American Economy in the post-war period. The Big-Three, as they are usually called, represented more than seventy percent of the market share of all the autos sold in the US up until the 1970s[2]. Nevertheless, their story is not only filled with success. Since the mid-twentieth century, the American Auto Industry faced two especially difficult periods.

The first was in the 1970s when fuel prices soared due to the Arab oil embargo in 1973, and due to the Iranian revolution in 1979. Furthermore, the American automakers faced growing Japanese competition simultaneously. The second period of difficulty is the one that will be studied, and was in the recent slump that brought the World Economy into recession in 2008 and 2009. By 2008, the Detroit automakers were already in a fragile situation. After 20 years of relatively good results, the American manufacturers were not capable of adjusting to the oil price increases that took place between 2003 and 2007, keeping their manufacturing based on Sport Utility Vehicles and pickup trucks, which were the opposite of what the market was demanding: fuel efficient vehicles. The credit crunch and the economic slowdown of 2008 placed pressure on prices of raw materials, and led to a huge drop in vehicle demand. By the end of 2008, the Big Three automakers asked for a government bailout in order to avoid bankruptcy.

[2] Klier and Rubenstein (2012).

The need for a Bailout for the Big-Three American automakers is, even today, in question. Obama's Administration in 2009 stated that the failure of the American auto industry would have been a catastrophe, with huge impacts in other Sectors of the American Economy. The ripple effect on parts and material suppliers – steel, rubber, glass and the fabricating trades – would have cost a million jobs and resulted in huge losses in tax revenues. The crash of the Big-Three automakers would be felt throughout the economy, from factories to dealerships to local governments and to schools.

Nevertheless, it was the Bush Administration that prompted the Bailout of the American automakers at the end of its tenure. On December 19th, 2008 the White House fact sheet that accompanied the announcement of a 17.4 billion dollars[3] government assistance to the Auto Industry stated that "the direct costs of American automakers failing and laying off their workers in the near term would result in a more than 1 percent reduction in real GDP growth and about 1.1 million workers losing their jobs, including workers for automotive suppliers and dealers".[4]

Given the relevance of the Auto Industry to the American Economy, which justified the political argument for an industry that is "Too Big to Fail", it is important to measure the consequences of Auto Industry Bailout to other Sectors of the American Economy. Which Sectors were more tightly connected to the American Auto Industry? This work project intends to answer that question by performing an Event Study. I studied the 10 main Sectors of the American Economy, according to the Global Industry Classification. Each Sector is composed by firms that are present in the S&P500, the index that puts together the 500 biggest American firms in terms of capitalization. The

[3] Page 43. Overhaul (2010).
[4] Klier and Rubenstein (2012).

Cumulative Abnormal Returns of all firms present in the S&P500 are analyzed around 5 major Events related to the Auto Industry Bailout. All the 5 Events were important daily occurrences of the Bailout process. Cumulative Abnormal Returns are the sum of Abnormal Share Price Returns. Abnormal Returns reflect the excess Share Price Return of a certain firm in relation to the market return. In this case, given that all firms belong to the same index, the S&P500 return is considered as market return. 3 different windows of Cumulative Abnormal Returns are computed. All start in 1 day before each event, and go to 1, 3, and 7 days after the same event.

Several Sectors appear to respond significantly to the Auto Bailout Events. Consumer Discretionary, Energy, Financials, Industrials, and Materials, are the Sectors that generally are significantly influenced by the Bailout to the Auto Industry. That response is also stronger in the shorter window [-1,1], which may mean that there is some kind of overreaction that vanishes as time passes by, at least for some Sectors such as the Energy, Materials, and Health Care. On the contrary, Consumer Discretionary, Industrials, and Information Technology, seemed to react more to the Auto Bailout Events when the windows are larger, as is in the case of the [-1,7] window. For the Energy and Materials Sectors, the Auto Events seemed to have a negative impact at the beginning, when I look to the smallest window, [-1,1], but then the impact turns out to be positive in the largest window [-1;7]. For instance, in the Energy Sector, Event 2 has a negative significant impact on Cumulative Abnormal Returns of 11.3% in the smallest window, but has a positive significant effect of 3.3% in largest window [-1;7]. A similar thing happens with the Materials Sector in 4 out of 5 Bailout Events. Event 2 has a negative impact of 3% on the shorter window of the Materials Sector. The same Event has a positive impact of 6% when the largest window is considered. Both values are

significant. This may indicate that these industries, and their stakeholders, after some days, perceive the Bailout Events as a solution to the problem of the Auto Industry and a favorable thing to the American Economy.

This work is organized in four additional parts. Part 2 reviews the existing literature on the relation between Financial Markets and important economic news, on the Bailout to the American Auto Industry in 2008 and 2009, and on the empirical methods of an Event Study. Part 3 presents the dataset that is used, and the empirical strategy that was conducted. Part 4 shows the results. Part 5 concludes.

2. LITERATURE REVIEW

There are several studies that try to measure the impact of economic policies and political events on financial markets. The main idea and the structure of my work came from two different sources: **Sazedj and Tavares (2011)** have analyzed, through a type of Event Study, the consequences of President Barack Obama's speeches and press conferences on the three main American stock returns indices (Dow Jones, S&P500, and NASDAQ), and the influence of its words in the behavior of economic agents. **Fisman (2001),** in his classical paper, looked at the effect of rumors over former Indonesian President Suharto that ruled Indonesia from 1967 to 1998. Fisman's prior conclusion was that due to Suharto's strong political influence and power, adverse events triggered by rumors over his health could lead to changes in the value of more politically connected firms, particularly in his final years in office. Looking at companies traded on the Jakarta Stock Exchange, Fisman performs an Event Study in which he clearly concludes that share price returns of politically connected firms were lower than the returns of less connected firms on the day of the events.

To understand the idiosyncrasies of the American Auto Industry, and the relation of the Detroit automakers with the American Economy, several investigations that have been made about the restless period of 2008 and 2009 for the Big-Three American auto makers were considered. **Klier and Rubenstein,** have done several works on the importance of the Auto Industry to the American Economy, and about the on goings of the Government Bailout to the Big-Three Detroit automakers. In **2012**, they studied why American automakers were already in a fragile situation when they faced the 2008 financial turmoil, and why the Auto Industry still is essential to the industrial production of the American Economy, and to the American political arena. Furthermore, they look at the amounts involved in the bailout, and how rescued automakers fulfilled the conditions underlined in the bailout.

Two thematic books about the American Auto Industry were also important to understand its evolution until the Bailout. One of them, **by Paul Ingrassia (2010)** makes a good overview over the American auto industry history, particularly of the Big-Three US automakers (General, Motors, and Chrysler), from their appearance in the beginning of the twentieth century until today. He explains the reasons that led to several moments of financial difficulty in the American Auto business throughout almost a century of history. Finally, he describes the course of the Bailout Events in 2008 and 2009. The other book, written by **Steven Rattner (2010)**, outlines his personal experience while he served as the head advisor to Barack Obama on the Task Force to the Auto Industry in 2009. He provides a clear insight into the different interests of the stakeholders in the Auto Industry, and on how difficult it was to negotiate the underlying conditions necessary for the bailout. **Cole et all (2008)** studied the presumed impact on the American Economy of a steep decline of Detroit Three

automakers, by assessing the impact on the American Economy of a putative contraction in car production, that would result from a non-bailout from the US government. The authors conclude that a contraction in the production of the American automakers would lead to significant losses in the overall American Economy, particularly in terms of tax receipts and average personal income.

Cooney et all (2009) looks at the Crisis of the Detroit Big-Three by following the restructuring plans done by General Motors and Chrysler after the bailout. Specifically, they focus on the debt targets and unit labor costs that should mandatorily shrink under the conditions of government assistance. They also try to assess the possible spillover effects on the American Economy of an Auto bankruptcy situation.

3. METHODOLOGY

Database description

The Share Price Returns were obtained through the Wharton Research Data Services, a web-based data service that provides financial and business information to the academic and research community. Daily Share Price Returns from September 12th, 2007 to September 11th, 2009 of all firms present in S&P500 are taken. The period studied will be from September 2008 onwards, where the majority of the Auto Industry occurrences took place. Share Price Returns before September 2008 will serve to compute previous calculations, which will be explained further in this work. Selected firms are all present in the S&P 500, an index that compounds the 500 largest American companies in terms of market capitalization, that have stocks listed on the New York Stock Exchange or NASDAQ. Evaluating the changes in value of the largest American firms in terms of market capitalization seems to be a good proxy of firm behavior, particularly firms from different Sectors of the American Economy.

The firms were, then, divided by Sectors. It is not easy to split firms into different industries since it is not always clear if two firms are competing in the exactly same market. There are several classifications for economic Sectors. A division according to the Global Industry Classification Standard (GIC), the classification that is widely used in investment research and by asset management professionals worldwide, was selected. GIC divides the S&P500 firms in 10 different Sectors: 1. Consumer Discretionary, 2. Telecommunication Services, 3. Consumer Staples, 4. Energy, 5. Financials Materials, 6. Health Care, 7. Industrials, 8 .Information Technology, 9. Materials, 10. Utilities. Then, one more crucial Sector is added to these 10: the Auto Industry. This group will be composed only by General Motors and Ford, both also present in the S&P500. Share Price Returns of Chrysler are not included, given that Chrysler has not been traded publicly since 1998, when it merged with Germany's Daimler-Benz. For a more detailed look to the firms that are present in each Sector refer to Appendix D at the end of this work project. For further description of the Sector Division that was chosen refer to Appendix C.

Estimation Strategy

An Event Study is used as an empirical strategy to identify which Sectors of the American Economy are linked to the Auto Industry. The Event Study Methodology was introduced by **Fama, Fisher, Jensen and Roll (1969)**, and has become the standard method of measuring security price reaction to some announcement or event. The Event Study has two main purposes: to test for the existence of an information effect, and to identify factors that explain changes in firms value on the event date. It assumes inherently that the market, in some degree, processes the information in an efficient and unbiased manner.

According to the episodes described in the book *Crash Course: The automobile industry road to bankruptcy and bailout* by Paul Ingrassia, and to the main Auto Bailout news reported by the press, 5 important daily Events, that were major occurrences in the Auto Industry Bailout, were chosen.[5]

1st Event (19 November 2008): The 3 CEOs of the main three American automakers go to Washington to request approximately $25 billion dollars of government aid to support their operations and to keep their companies afloat. It was the first official confirmation that American auto makers were in big trouble. All three CEOs travelled from Detroit to Washington in their private jets, provoking a giant public flurry.

2nd Event (4 December 2008): The 3 CEOs go back to Washington to testify before Congress to make a stronger case about why they need government help to keep the business running. This time, they decided to travel in fuel-efficient hybrid cars of their companies.

3rd Event (19 December 2008): Speaking from the White House, President Bush says that the American government will grant loans to the Big-Three Detroit based firms to avoid an industry collapse and due to the Auto Industry importance to the American Economy. It was the first sign that the American Government was available to provide money to the automakers. It was also the biggest industrial bailout in American history.

4th Event (30 March 2009): President Barack Obama addresses the nation to say that working capital will be provided to General Motors in the next 60 days, under tough restructuring conditions. The President also states that Chrysler will receive more

[5] The Bailout of the Auto Industry was composed by several important moments spread out in time. The exact occurrence dates of some of them differ according to the source. The dates of the 5 Events that were chosen in this work project were consistently the same in different sources.

treasury capital in the next 30 days, but that urgently needs a business partner to remain viable.

5th Event (1 June 2009)**:** – Government loans proved fruitless and General Motors officially files for bankruptcy. It was the 4th largest bankruptcy in history. General Motors was set to close a dozen plants and to cut more than 20000 jobs.

Hence, my Event Study attempts to analyze how the different Sectors of the American Economy reacted to such events. In order to measure each Sector's reaction, the variation of the Share Prices of the firms present in each Sector is studied. My dependent variable is Cumulative Abnormal Returns that are obtained through the previous calculation of all firms Daily Abnormal Returns. Daily Abnormal Returns tell us how different the return of a given firm is in relation to the market return. As all our firms belong to the S&P500, Share Price Returns of the overall S&P500 index are used to compute Daily Abnormal Returns. Computation of Cumulative Abnormal Returns follows. The idea behind considering Cumulative Abnormal Returns is that it makes it easier to make overall inferences regarding the reaction to the event of interest, and to account for the fact that investors and stakeholders may not become aware of a certain Event immediately. Cumulative Abnormal Returns pretend, therefore, to account for some expectable lag in information assimilation and to correct for excessive over or under reactions. I will consider 3 different windows of Cumulative Abnormal Returns: [-1;1], [-1,3], [-1,7]. From 1 day before each Event, to capture market volatility right before the event, to 3, 5, and 7 days, respectively, after the same Event.

Firstly, Daily Abnormal Returns are computed in the following way:

(1) $Daily\ Abnormal\ Returns_i = Return_i - \beta_{Sector} * Market\ Return$

where *Return* is the Share Price Return of firm i on a given day, Market Return is the Daily Returns of the S&P500. β is the Market Return coefficient that is different for the 11 Sectors that are considered; it represents the different impacts that the Market Return has in each different Sector. β is calculated through the time period between September 12th, 2007 to September 11th, 2008, while the daily abnormal returns that will be used to compute our results are calculated from September 12th, 2008 to September 11th, 2009. The β of each Sector is calculated outside this time period to avoid possible bias in our results.

The three different windows of Cumulated Abnormal Returns are computed as follows:

(2) $CAR_t^{[-1;1]} = Abnormal\ Return_{t-1} + Abnormal\ Return_t + Abnormal\ Return_{t+1}$

(3) $CAR_t^{[-1;3]} = CAR_t^{[-1;1]} + Abnormal\ Return_{t+2} + Abnormal\ Return_{t+3}$

(4) $CAR_t^{[-1;7]} = CAR_t^{[-1;3]} + Ab\ Ret_{t+4} + Ab\ Ret_{t+5} + Ab\ Ret_{t+6} + Ab\ Ret_{t+7}$

The intention now is to verify how Cumulated Abnormal Returns respond to the five-selected Auto Industry Bailout related Events, in all of the 11 different Sectors that were chosen.

To measure the impact of each Event on firm's Cumulative Abnormal Returns in a time period from September 12th, 2008 to September 11th, 2009 (252 working days), the following regression was run:

(5) $CAR_i = \alpha_j \times Event_j + \varepsilon_i \quad if\ firm\ i\ belongs\ to\ sector\ x$

$$x = Auto, 1, 2, 3, 4, 5, 6, 7, 8, 10$$

where CAR_i are the Cumulative Abnormal Returns of a given firm present in the S&P500 between September 12th, 2008 and September 11th, 2009, and the coefficient α

measures the impact of the Auto Events on the Cumulative Abnormal Returns of firm *i*. *j* goes from 1 to 5, and corresponds to the 5 selected Auto Events. The regression is then conditioned to the Sector to which firm *i* belongs in order to look to the impact of the 5 Events according to the 11 different Sectors. (x = Auto Industry; 1. Consumer Discretionary; 2. Telecommunications; 3. Consumer Staples; 4. Energy; 5. Financials; 6. Health Sector; 7. Industrials; 8. Information and Technology; 9. Materials; 10. Utilities).[6]

Basically, by restringing the sample of all firms to only the ones belonging to a specific Sector, an assessment of how the Cumulative Abnormal Returns of a certain Sector react to the selected Auto Bailout Events can be done.

As previously stated, the 5 days of Auto Events are: 19 Nov 2008, 04 Dec 2008, 19, Dec 2008, 30 Mar 2009, and 01 Jun 2009, respectively.

4. RESULTS

Description

In this section the estimated results are presented. In tables 1, 2, and 3, Ordinary Least Square regressions can be found, with robust standard errors of the previous defined three windows of Cumulative Abnormal Returns: [-1,1], [-1,3], [-1,7]. These three windows have the purpose of giving us different spectrums of time. The first tries to look at the short-run reaction to the Auto Events. The last looks to the reaction of investors based in a more thoughtful reasoning in processing information. The impact of each Event on the 10 different Sectors plus the Auto Industry is shown. Together with

[6] For completeness of the results, an additional regression can be found in Appendix B. The relation between events and sectors is found to be quite similar to the one presented in the main regression.

the linear combination of all the Events, this is the total impact of all 5 of the Events on the Cumulative Abnormal Returns of a certain Sector.

For the Auto Industry, all of the significant values have a negative sign for every single window. This means that the Events that were selected are perceived as being bad to the business of automakers. Event 3, for example, when Bush makes his statement about the need for an Auto Bailout, has a significant negative impact on the Auto Industry in all windows of Cumulative Abnormal Returns. In the first window, that sums the Abnormal Returns in the 3 days around the Auto Events, Event 3 pushes Cumulative Abnormal Returns of the Auto Industry down around 14%. Therefore, looking at all the 3-day Cumulative Abnormal Returns of the Auto firms during the year, Event 3 on December 4th, 2008, decreases the Cumulative Abnormal Returns, on average, by 14%. In the second window, that considers 5-days around the Event, Event 3 has, on average, a negative effect of 27,9% on Cumulative Abnormal Returns of the Auto Industry in that day. In the last window that goes from the day before the Event to 7 days after the same Event, Event 3 has a negative impact of 31,2% on the Cumulative Abnormal Returns of the Auto Industry. All of these values are significant. Share Prices of Auto firms (General Motors and Ford) were truly slashed in this period.[7]

It is interesting to note that some Bailout Events seem to have no significant impact on the Auto Industry itself. This may be explained by some anticipation of the announcements from the stakeholders of the automakers business, that may had have faster access to important information in relation to other economics agents.

[7] Share Prices of General Motors and Ford in this period can be found in Appendix A.

Table 1, the first window of Cumulative Abnormal Returns, is where more significant values were found. There are 34 times in which Events have a significant impact on economic Sectors considered. Events seem to have a particularly negative significant impact on Sectors 4 and 9, Energy and Materials, respectively.

Table 1 - Impact of Auto Industry Events on the CAR of different Economic Sectors

[-1;1] window

	Auto Industry	Consumer Discretionary	Telecommunication	Consumer Staples	Energy	Financials	Health Care	Industrials	Information Technology	Materials	Utilities
Event 1	0.0461	-0.0037	**-0.0790*** **	0.0043	**-0.120*** **	**-0.0258** **	**-0.0605*** **	0.0114	0.0016	**-0.0468*** **	**-0.0204** **
	(-0.0405)	(-0.0099)	(-0.0258)	(-0.0089)	(-0.0130)	(-0.0130)	(-0.0105)	(-0.0088)	(-0.0096)	(-0.0142)	(-0.0093)
Event 2	**-0.135** **	**0.0540*** **	0.0213	0.0163*	**-0.113*** **	**0.0839*** **	**0.0251*** **	**-0.0148** **	0.0102	**-0.0309** **	**-0.0229*** **
	(-0.064)	(-0.009)	(-0.0337)	(-0.0091)	(-0.0084)	(-0.0158)	(-0.0078)	(-0.0061)	(-0.0078)	(-0.0125)	(-0.0074)
Event 3	**-0.144*** **	-0.0089	0.0215	**0.0222*** **	**-0.0659*** **	0.0054	**0.0194*** **	0.0053	-0.0061	**-0.0495*** **	**0.0239*** **
	(-0.0084)	(-0.0063)	(-0.0138)	(-0.0077)	(-0.0084)	(-0.0058)	(-0.0052)	(-0.0061)	(-0.0065)	(-0.0101)	(-0.0054)
Event 4	**-0.267***	-0.0096	0.0151	-0.0032	**-0.0593*** **	**0.0148** **	**0.0103** **	**-0.0152*** **	-0.0048	**-0.0147** **	0.0072
	(-0.161)	(-0.0061)	(-0.0118)	(-0.0042)	(-0.0068)	(-0.0074)	(-0.0049)	(-0.0040)	(-0.0057)	(-0.0071)	(-0.0046)
Event 5	-0.300	**0.0295*** **	-0.0091	**0.0151*** **	**0.0245*** **	**-0.0210*** **	**0.0193*** **	**0.0262*** **	-0.0053	**0.0269*** **	**0.0104*** **
	(-0.266)	(-0.0059)	(-0.0074)	(-0.0052)	(-0.0062)	(-0.0061)	(-0.0057)	(-0.0057)	(-0.0036)	(-0.0081)	(-0.0037)
All Events	-0.7995	**0.0613*** **	-0.0303	**0.0547** **	**-0.3328*** **	0.0573	0.0136	0.0128	-0.0044	**-0.1150*** **	-0.0019
	(-0.3204)	(-0.0171)	(-0.0467)	(0.0163)	(0.0198)	(0.0233)	(0.0160)	(0.0141)	(0.0155)	(0.0240)	(0.0143)
Nr. of Obs.	504	17,640	1,512	8,568	9,072	21,168	11,340	14,616	15,624	7,560	7,560
R2	0.0320	0.0050	0.0170	0.0030	0.0400	0.0040	0.0110	0.0030	0.0000	0.0080	0.0050

Note: Robust Standard errors in parentheses. ***Denotes significance at the 1% percent confidence level, ** at the 5 percent confidence level, * at the 10 percent level.

Other Sectors such as Sector 1 and 3, Consumer Discretionary and Consumer Staples, seem to have a positive reaction of their Cumulative Abnormal Returns in response to

the Auto Events. Events 2 and 5, with 5 significant coefficients each, seem to be the Events with the biggest impact on this short-term window.

Table 2 - Impact of Auto Industry Events on the CAR of different Economic Sectors

[-1;3] window

	Auto Industry	Consumer Discretionary	Telecommunication	Consumer Staples	Energy	Financials	Health Care	Industrials	Information Technology	Materials	Utilities
Event 1	**0.0098**	**0.0155**	**-0.0387****	**0.014**	**0.0074**	**0.0223**	**-0.0475*****	**0.0128**	**0.00136**	**-0.0068**	**0.0140***
	(-0.0778)	(-0.0103)	(-0.0194)	(-0.0116)	(-0.009)	(-0.0141)	(-0.0101)	(-0.0084)	(-0.0106)	(-0.0156)	(-0.0078)
Event 2	**-0.0017**	**0.0478*****	**0.0419**	**-0.0074**	**-0.0281*****	**0.0782*****	**0.013**	**-0.0045**	**0.0455*****	**0.0284****	**-0.0359*****
	(-0.0748)	(-0.0086)	(-0.0419)	(-0.0101)	(-0.0082)	(-0.0188)	(-0.008)	(-0.0085)	(-0.0092)	(-0.0131)	(-0.0045)
Event 3	**-0.279*****	**-0.00771**	**0.0117**	**0.0218****	**-0.0673*****	**0.0107**	**0.0208*****	**0.00926**	**-0.0117**	**-0.0452*****	**0.0137****
	(-0.036)	(-0.007)	(-0.0186)	(-0.0089)	(-0.0105)	(-0.0092)	(-0.0054)	(-0.0063)	(-0.0076)	(-0.01)	(-0.0067)
Event 4	**-0.253**	**0.0286*****	**0.0430*****	**0.00823***	**-0.0202*****	**0.00724**	**-0.00488**	**0.0167*****	**0.0058**	**0.0160***	**-0.0005**
	(-0.17)	(-0.0084)	(-0.0164)	(-0.005)	(-0.0062)	(-0.008)	(-0.006)	(-0.0047)	(-0.00577)	(-0.0083)	(-0.0049)
Event 5	**-0.199**	**0.0127****	**-0.0218**	**0.0118****	**0.0003**	**0.0014**	**0.00133**	**0.0289*****	**0.0033**	**0.0188****	**0.005**
	(-0.192)	(-0.0062)	(-0.0159)	(-0.006)	(-0.0086)	(-0.0062)	(-0.007)	(-0.0067)	(-0.0046)	(-0.009)	(-0.0038)
All Events	**-0.7237*****	**0.0969**	**0.0362**	**0.0485**	**-0.1079*****	**0.12*****	**-0.0173**	**0.0631*****	**-0.0442**	**0.0113**	**-0.0037**
	(-0.2808)	(-0.0183)	(0.0547)	(-0.0193)	(-0.0192)	(-0.0272)	(-0.0168)	(-0.0158)	(-0.0176)	(-0.026)	(-0.013)
Nr. of Obs.	504	17,640	1,512	8,568	9,072	21,168	11,340	14,616	15,624	7,560	7,560
R2	0.018	0.003	0.008	0.002	0.04	0.002	0.004	0.002	0.002	0.003	0.003

Note: Robust Standard errors in parentheses. ***Denotes significance at the 1% percent confidence level, ** at the 5 percent confidence level, * at the 10 percent level.

In Table 2, 25 significant values are observed. The Auto Industry seems to be hit particularly hard when looking at this window, shown by the significance of the linear combination of all the five Events on the American Auto Industry. The Energy Sector, once again, responds in a quite negative and significant way to almost all of the Events.

Looking at the last window of Cumulative Abnormal Returns, in Table 3, Event 3 is the one with a more significant impact; it has 7 significant coefficients out of 11.

Table 3 - Impact of Auto Industry Events on the CAR of different Economic Sectors

[-1;7] window

	Auto Industry	Consumer Discretionary	Telecommunication	Consumer Staples	Energy	Financials	Health Care	Industrials	Information Technology	Materials	Utilities
Event 1	**0.449*** ** (-0.0095)	**0.0756*** ** (-0.0097)	**0.0183** (-0.0157)	**0.0103** (-0.0136)	**-0.0129** (-0.0122)	**0.0303** ** (-0.0119)	**-0.0452*** ** (-0.0124)	**0.0461*** ** (-0.0111)	**0.0220** ** (-0.0104)	**0.0242** (-0.0173)	**0.0059** (-0.0075)
Event 2	**-0.0425** (-0.12)	**0.0389*** ** (-0.0107)	**0.0006** (-0.0354)	**0.0105** (-0.0113)	**0.0105** (-0.0113)	**0.0477** ** (-0.0224)	**0.0177** (-0.0119)	**-0.0122** (-0.0093)	**0.0551*** ** (-0.0119)	**0.0609*** ** (-0.0159)	**-0.0257*** ** (-0.0054)
Event 3	**-0.312*** ** (-0.0015)	**-0.0038** (-0.0075)	**0.0215** (-0.0138)	**0.0243*** ** (-0.0085)	**-0.0122** (-0.0106)	**0.0125** (-0.0102)	**0.0275*** ** (-0.007)	**0.0274*** ** (-0.0078)	**-0.0140*** (-0.0077)	**-0.0251*** (-0.0135)	**0.0370*** ** (-0.0061)
Event 4	-0.1220 -0.3070	**0.0466*** ** (-0.0109)	**0.0356** (-0.0219)	**0.0107*** (-0.0065)	**-0.0131** (-0.008)	**0.0274*** ** (-0.0097)	**-0.0055** (-0.0082)	**0.0153*** (-0.0086)	**0.0264*** ** (-0.0066)	**0.0087** (-0.0111)	**0.0370*** ** (-0.0061)
Event5	**0.171** ** (-0.0864)	**0.0170** ** (-0.0071)	**-0.0266** (-0.0196)	**0.0022** (-0.0072)	**0.0101** (-0.00997)	**-0.0014** (-0.0087)	**-0.0119** (-0.0076)	**0.0391*** ** (-0.0081)	**0.0145** ** (-0.0069)	**0.0246*** (-0.0134)	**0.0121*** ** (-0.004)
All Events	**0.1441** 0.341	**0.1744*** ** 0.0208	**0.0494** 0.0505	**0.0579*** 0.0218	**0.0049** 0.0237	**0.1164*** ** 0.0303	**-0.0173** 0.0217	**0.1158*** ** 0.1158	**0.1041*** ** 0.02	**0.0933** ** 0.0322	**0.0329** 0.013
Nr. of Obs.	504	17,640	1,512	8,568	9,072	21,168	11,340	14,616	15,624	7,560	7,560
R2	0.022	0.004	0.002	0.001	0.001	0.001	0.002	0.003	0.003	0.002	0.002

Note: Robust Standard errors in parentheses. ***Denotes significance at the 1% percent confidence level, ** at the 5 percent confidence level, * at the 10 percent level.

Sector 1 (Consumer Discretionary), Sector 7 (Industrials), and Sector 8 (Information Technology) seem to be the ones that are more affected by the 5 Auto Bailout Events in the longest period window. Generally, all these 3 Sectors show significant positive responses to the American Auto Bailout Events.

What is interesting here is, at odds with the two previous shorter windows, the major parts of the significant coefficients are positive. This may mean that the firms of each Sector, after at least 3 days, start to perceive the Events related to the Auto Industry as a good thing for their own business. On the contrary, when the Events arise, some Sectors seem to overreact to our Events about the American Auto Industry Bailout, for example the Energy Sector, which compounds companies, engaged in the exploration, production, marketing, refining and transportation of oil and gas products, coal and other consumable fuels. Given that 70% of all oil consumed in the U.S. is used for transportation, it makes sense that the Energy Sector seems to be one of the most affected industries by the Auto Industry Events.[8]

There are several Sectors that seem to decrease the scale of their response to the Auto Events as the length of our windows is augmented. It is clear that in the case of Sectors 4 (Energy), 6 (Health Care), 9 (Materials), as we move to a larger window, less significant coefficients for the Auto Events are obtained. This may mean that in the beginning the stakeholders in these Sectors start to perceive that there is a problem with the Auto Industry that may affect their own Sector, but then, after some days, they see these Bailout Events as possible solutions to a problem that already existed.

Contrarily, other Sectors such as Sector 1 (Consumer Discretionary), Sector 7 (Industrials), and Sector 8 (Information Technology), seem to become aware of the impact of the Auto Bailout Events only after a short period of time. These Sectors, looking at the first window, [-1,1], do not seem to respond significantly to the Event

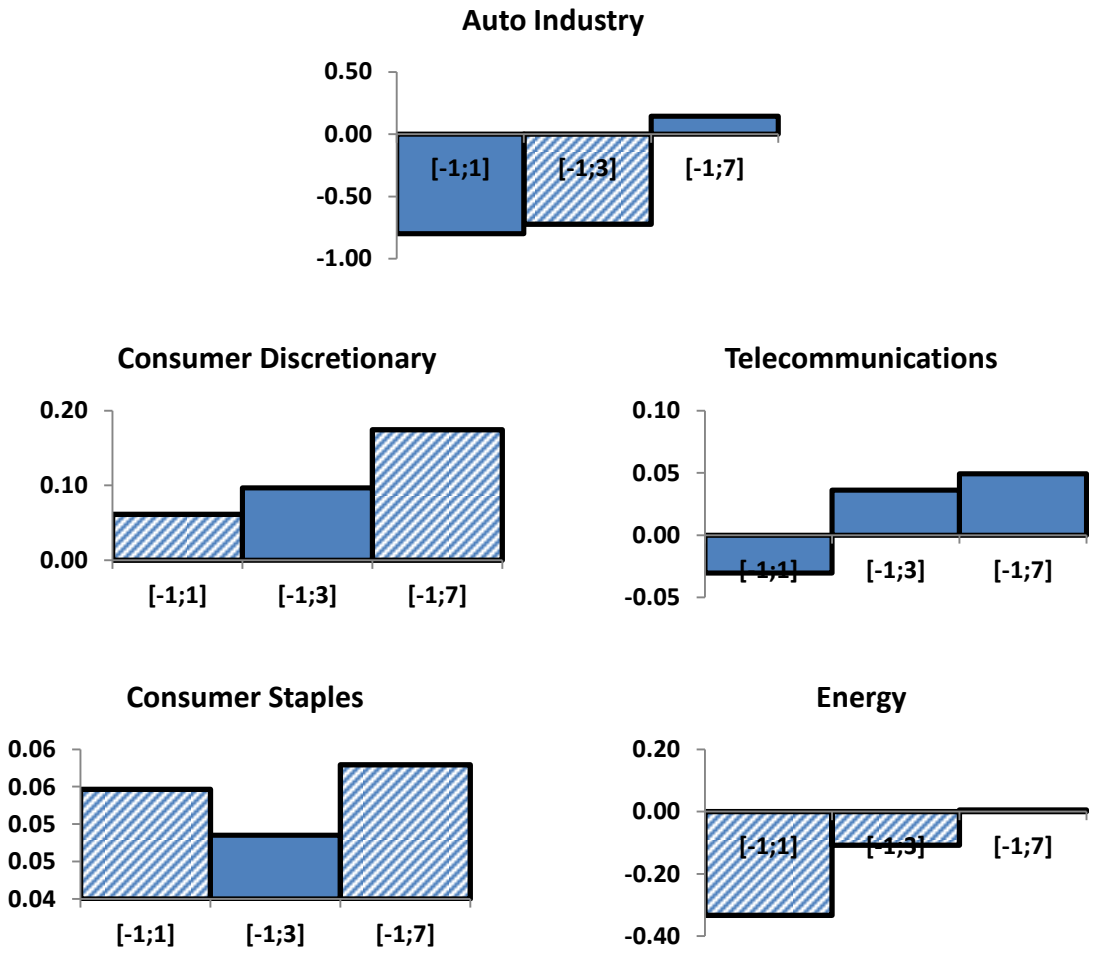
[8] Information provided by the American Energy Independence. For more refer to americanenergyindependence.com.

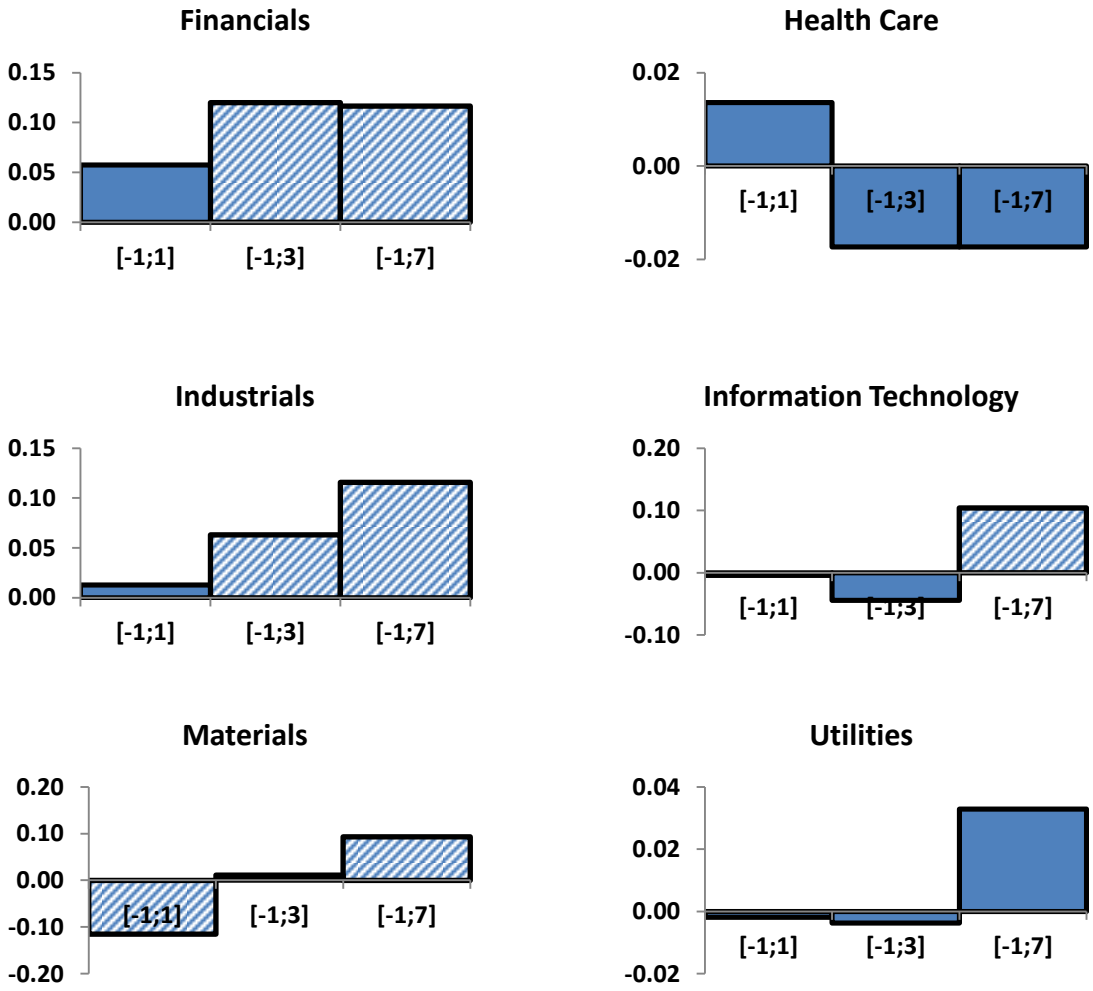
Days. Nevertheless, in the last window, almost all the Event coefficients have a significant impact on the Cumulative Abnormal Returns of these 3 Sectors.

Graphical analysis

A better idea of these results can be taken by looking to Figure 1. Below the Sector reaction to the linear combination of all the Auto Bailout Events is shown. Grid columns represent those windows where the impact of the all the Events was significant.

Figure 1.





As stated above, here it is clear that taking into consideration the impact of all the Auto Bailout Events, there are Sectors that seem to react in a negative way at the beginning, perceiving the Bailout as bad for their business, but after some days the reaction is positive and the Bailout passes over as a valid solution.

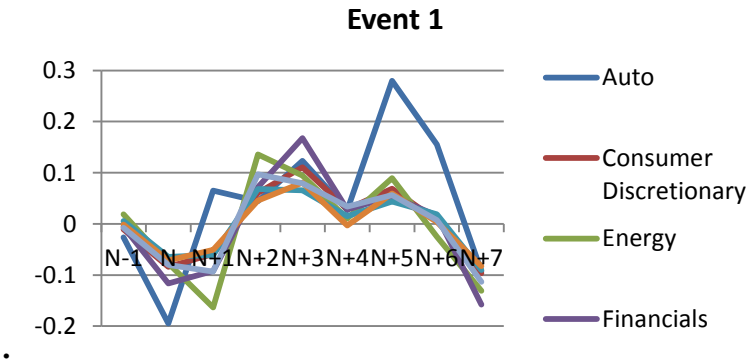
This behavior is observed mainly in the Auto Industry, Energy Sector, and Materials Sector. Sectors such as Financials and Industrials have a positive reaction in terms of Cumulative Abnormal Returns in all of the 3 studied windows. That tells us that since the beginning of the Auto Bailout Events, stakeholders of Financials and Industrials considered the Bailout a good thing to their industry and to the overall economy.

Besides the Health Sector, all Sectors show a positive response to the 5 Auto Bailout Events in the longest window, [-1,7]. The Sectors' stakeholders seem, after some over reaction to new information, to interpret the Government Bailout of the Auto Industry as a favorable occurrence.

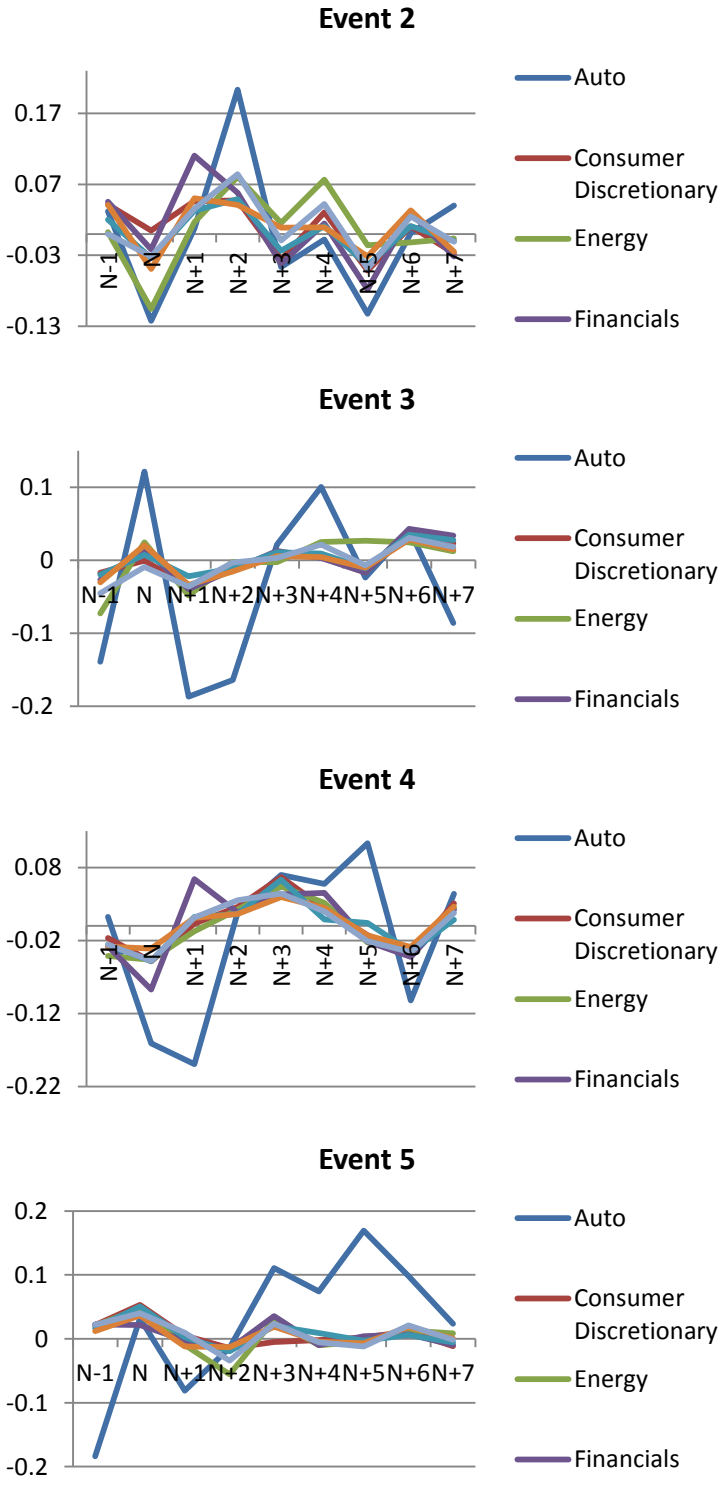
Furthermore, in Figure 2, it can be seen that all of these Sectors seem to move together along the days around the Event. Underneath a graphic observation of Market responses of the Auto Industry is depicted, and the Sectors that were seen above as more connected with the Auto Industry. As such, this time, to get a more immediate reaction, instead of Cumulative Abnormal Returns, Sector's Daily Share Price Returns can be observed. In the horizontal axis a spectrum of 8 days is depicted, where N is the day when the Auto Bailout Event took place.

The Sectors that were analyzed are the ones that seem more tightly connected with the Auto Industry: Consumer Discretionary, Energy, Financials, Industrials, Information Technology, and Materials. The Daily Share Price Returns of each Sector are an arithmetic average that compounds every firm present in that Sector.[9]

Figure 2.



[9] To see the firms that are present in each sector refer to Appendix D.



Despite the higher volatility of the Share Price Returns of the Auto Industry, it is clear that all of these Sectors seem to move together around the days of the Auto Industry

Bailout Events, whether a negative or positive share price return is observed. This may indicate that in fact there are some Sectors more correlated to the Auto Industry than others, when looking to market share valuation. This also indicates that some major Events in one Sector may decisively influence the market performance of other different Sectors of economic activity.

5. CONCLUSION

The Auto Industry has always been one of the cornerstones of the American Economy. Unsurprisingly, the downfall of the Big-Three American automakers represented an important occurrence. Despite the loss in world market share in the last 30 years, the American Industry was on the edge of the crisis a fundamental industry for the American Economy.

In 2007, there were 1 million manufacturing jobs in the auto industry, not accounting for the workers of dealerships and suppliers. 16.2 million Motor vehicles were sold in the United States in 2007.[10] In the same year, the Auto Industry represented 3.6% of total United States output. This means that, in practical terms, a decrease of 30% in the productions of the American Economy would represent a squeeze of 1% on the total United States Economy.

It seemed, in fact, a "Too Big to Fail" Industry for the American Economy. Almost 80 billion dollars were provided by the American treasury to the three American automakers to make them stay afloat, both by the Bush and the Obama Administrations.[11]

[10] Klier and Rubenstein (2012)
[11] Cole et all (2008)

Given the weight of the Detroit Big-Three automakers on the overall economy, and the amount of capital provided by public authorities in the restless period of 2008 and 2009 to the Auto Industry, it was expectable a reaction coming from other important Sectors of the American Economy. To assess if other Sectors of the American Economy react to the Bailout of the Auto Industry, an Event Study is performed to look at how Share Price Returns of different firms respond to given Auto Bailout Events. Cumulative Abnormal Share Price Returns of the different important Sectors are observed in order to analyze if some Sectors respond more than others when the Bailout to the Auto Industry takes place. 5 different Auto Bailout related Events were selected, and 10 different economic Sectors, plus the Auto Industry, composed by General Motors and Ford. In fact, Bailout Events seem to have a statistically significant impact on several Sectors of the American Economy. Particularly, there were significant impacts on the following Sectors: Consumer Discretionary, Energy, Financial, and Materials. The impacts then differ according to the window that is used for the Cumulative Abnormal Returns. Some firms seem to respond more in a short window, such as [-1,1], and less in one as [-1,7], which may indicate some overreaction from the investors. On the contrary, other Sectors only respond significantly to the Auto Bailout Events in larger windows as [-1,3], and mainly, [-1,7], which highlight the possibility of a delay in the assimilation of information from the stakeholders of those Sectors.

Generally, and after some days, the reaction of the major part of the Sectors is positive, which indicates that investors in these industries perceived the Bailout of the Auto Industry as a good thing, not only for their Sectors, but also for the overall American Economy.

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